

Namco-America, Inc.

AIR COMBATTM



Operators Manual

FCC Notice

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

AIR COMBATTM

Operators Manual

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11. LIST OF ILLUSTRATIONS

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AIR COMBAT™

1. SPECIFICATIONS

POWER SUPPLY:	PC XT Type Switching Power Supply – 200 Watts		
POWER CONSUMPTION:	120VAC, 5.0 AMP		
DIMENSIONS:	Width	Depth	Height
Assembled Game	42.81"	110.62"	77.12"
INSTALLED GAME WEIGHT:	1,041 lbs.		
CRATED DIMENSIONS:	Width	Depth	Height
Monitor Cabinet Assy.	44"	33.75"	65.5"
Seat Assembly	34.38"	68.5"	54"
Marquee Assembly	44"	11.75"	13.5"
SHIPPING WEIGHT:			
Monitor Cabinet Assy.	559 lbs.		
Seat Assembly	463 lbs.		
Marquee Assembly	69 lbs.		
MONITOR:	One (1) 46" Rear Projection Color Monitor with remote control		
ACCESSORIES:	Keys: (Coin Box) 2		
	(Coin Door) 2		
	(Monitor Cabinet) 2		
	Security Wrench 1		
	Instruction Manual 1		

Note: Specifications may change without prior notice. Modification and/or alteration of the AIR COMBAT™ game with kits or parts not supplied by NAMCO may void the warranty.

2. PRECAUTIONS

2-1 Cautions When Installing

This game is designed for indoor use only. The game must not be installed outdoors or under the following conditions:

- In areas directly exposed to sunlight, high humidity, direct water contact, dust, high heat or extreme cold.
- In locations that would present an obstacle in case of emergency, i.e. near fire equipment or emergency exits.
- On an unstable surface or floor subject to vibration.

2-2 Caution When Handling

- a. AC power must always be turned **OFF**, and the game unplugged, before replacing any parts or connecting/disconnecting connectors.
- b. When unplugging the game from an electrical outlet, always grasp the plug, not the cord.
- c. Do not subject game to physical shock when transporting or moving it.
- d. The power supply range is between 110-120VAC, (switchable to 220 VAC).
- e. The cabinet must be grounded with a securely connected ground plug.
- f. Care must be taken at all times to avoid electrical shock whenever inspecting or adjusting the game, particularly around the monitor.
- g. Always return the leg levelers to the extreme "up" position before moving the game, and separate the game into its two assemblies – monitor cabinet and seat.
- h. Adjustment is required whenever the game PC board, ROM, Joystick, Throttle Control or other potentiometers are changed.
- i. **DO NOT** attempt to repair the Printed Circuit Board (PCB). It contains sensitive chips that could easily be damaged by even the small internal voltage of a multi-meter. Always return the PCB to your distributor for any repairs.

2-3 Caution When Handling Rear Projection Screen

The rear projection screen is easily damaged, or deformed, unless proper care is given to it's care and cleaning.

- a. The screen should generally be cleaned by wiping gently with a soft cloth.
- b. If extremely dirty, wet a cloth with a mild solution of neutral detergent and water, wring dry, and wipe gently. Finish with a soft dry cloth.
- c. **Never:**
 - Use any chemical cleaners like paint thinner, benzine etc.
 - Use any alkaline or acid based detergent.
 - Apply any volatile matter such as insecticide.
 - Leave the screen in contact with rubber or vinyl products for any extended time.

3. INSPECTION

The AIR COMBAT Game cartons should be carefully inspected upon receipt to insure that the game is complete and was delivered in good condition.

Inspect the game cabinet by doing the following:

1. Examine the monitor cabinet exterior and seat assembly for dents, chips, or broken parts.
2. Open the side service door and the coin door on the seat assembly as well as the back cover of the monitor cabinet, and inspect the interior as follows:

- a. Verify that all plug-in connectors are firmly plugged in. DO NOT force connectors together. The connectors are keyed so they fit only in the proper orientation. A reversed edge connector can damage a PCB and will void your warranty.
- b. Inspect the power cord to insure that there are no cuts or dents in the insulation.
- c. Inspect the power supply connectors.
- d. Inspect other major sub-assemblies, such as the rear projection monitor, PCB, leg levers, and speakers. Make sure that they are mounted securely and that all ground wires are firmly connected.

4. INSTALLATION

4-1 Game Components

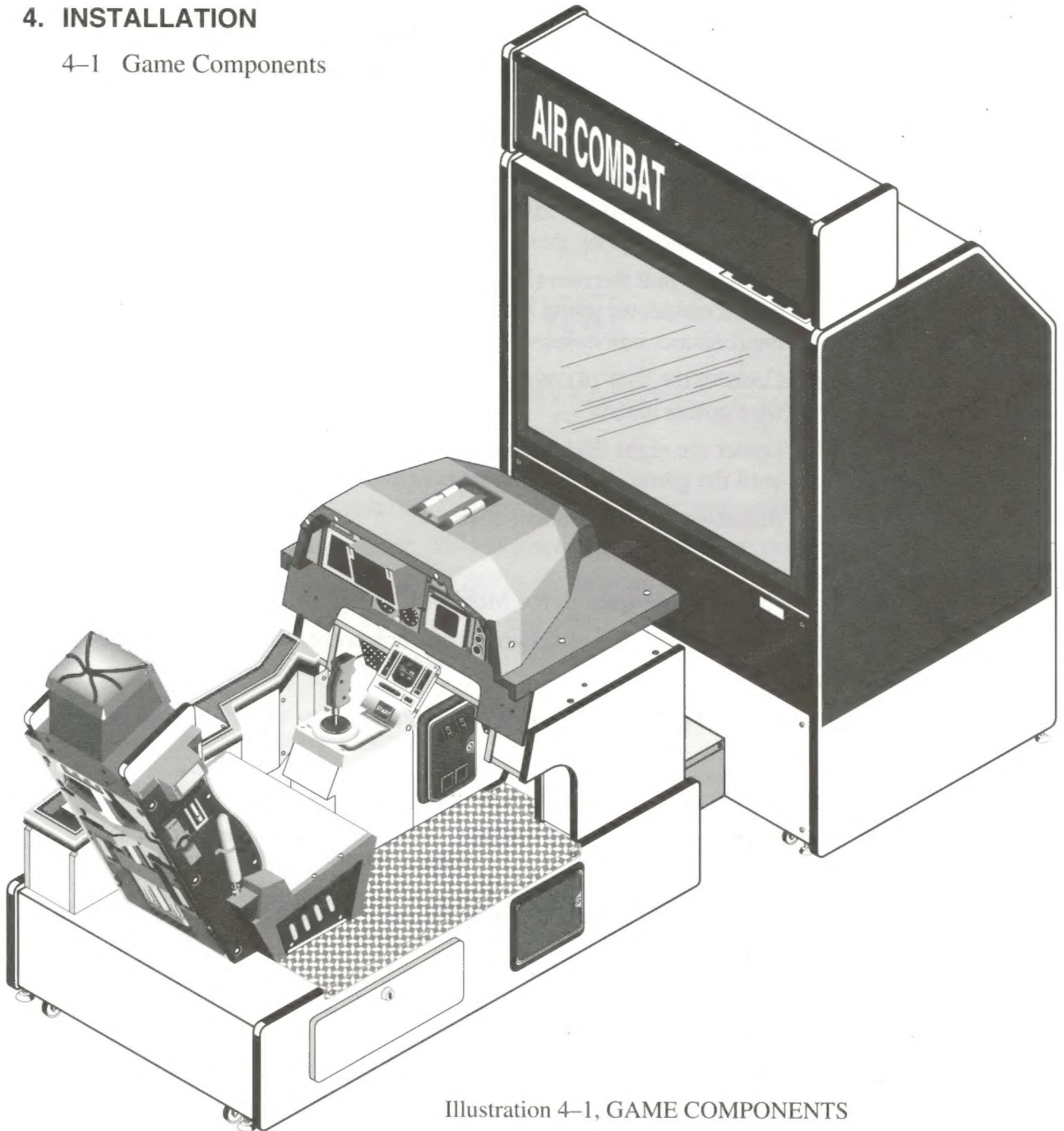


Illustration 4-1, GAME COMPONENTS

4-2 Attaching the Cockpit Cabinet to the Monitor Cabinet

4-2-1 Attaching the Interconnect Box to the Monitor Cabinet

- a. Remove the interconnect metal box cover by removing the six (6) button head screws.
- b. Attach the interconnect box to the monitor cabinet lower front panel by inserting four (4) 1/4-20 bolts through the box holes into the monitor cabinet, and tighten them.
- c. Carefully pull the two (2) six-position and two (2) three-position molex connectors game harness out through the monitor and interconnect box holes.

4-2-2 Attaching the Interconnect Box to the Cockpit Cabinet

- a. Roll the monitor cabinet to its intended operating area and place in position.
- b. Roll the cockpit cabinet close to the interconnect box.
- c. Attach the interconnect box to the cockpit cabinet lower front panel by inserting four (4) 1/4-20 bolts through the box holes into the cockpit cabinet, and tighten them.
- d. Carefully pull the two (2) six-position and two (2) three-position molex connector game harness out through the cockpit cabinet and interconnect box holes.
- e. Connect the four (4) molex connectors together. Make sure that the wire colors match.
- f. Lower the eight (8) leg levelers of the game and adjust all leg levelers until the game is stable and rests firmly on the floor.
- g. Reinstall the interconnect cover.

4-3 Attaching the Monitor Marquee to the Monitor Cabinet

1. Remove four (4) 1/4-20 bolts, two (2) on each end of the bottom of the marquee box.
2. Remove four (4) 1/4-20 bolts, two on each end of the top of the monitor cabinet.
3. Install two (2) metal "Z" brackets on the marquee box predrilled holes.
4. Connect three-position molex marquee connector with the monitor cabinet connector.
5. Install and secure the marquee box to the monitor cabinet with the remaining 1/4-20 bolts.

4-4 Setting Game Options

Refer to Section 5 of this manual. The Service Panel and Service Switch are located inside the Coin Door.

5. ADJUSTMENTS

5-1 Power on

When installation is complete, connect the power cord to an AC outlet and turn the power on. The Power on/off Switch is located on the lower right of the Monitor Cabinet. Use the TV remote control to turn the TV on.

5-2 Adjustment switches on the Service Panel

The Service Panel is located behind the coin door. It has controls for adjustment of the speaker volume and balance, and switches for accessing the test modes.

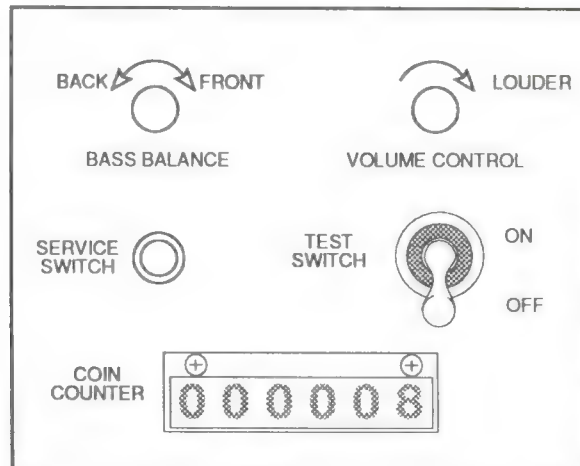


Illustration 5-1, SERVICE PANEL

1. Test Switch

Turning this switch "ON" enters the Test Mode, and activates the Menu Screen on the monitor. This is where the self-tests are performed, and game variables (pricing, level of difficulty, potentiometer adjustment etc.) are set/changed (Ref. 5-3). Turn the test switch to the "OFF" position at any time to return to the Game Mode.

2. Audio Volume Control

The audio volume adjustment controls the volume of all four (4) speakers.

3. Audio Bass Balance Control

This volume control is used to balance the volume between the two front speakers and the two rear speakers.

4. Service Switch

By pressing this switch, credits can be issued without advancing the coin counter. This switch is also used to change screens in the Test Mode.

5-3 Test Mode

Open the coin door and move the test switch to the "ON" position. The "Menu" Screen is displayed on the monitor.

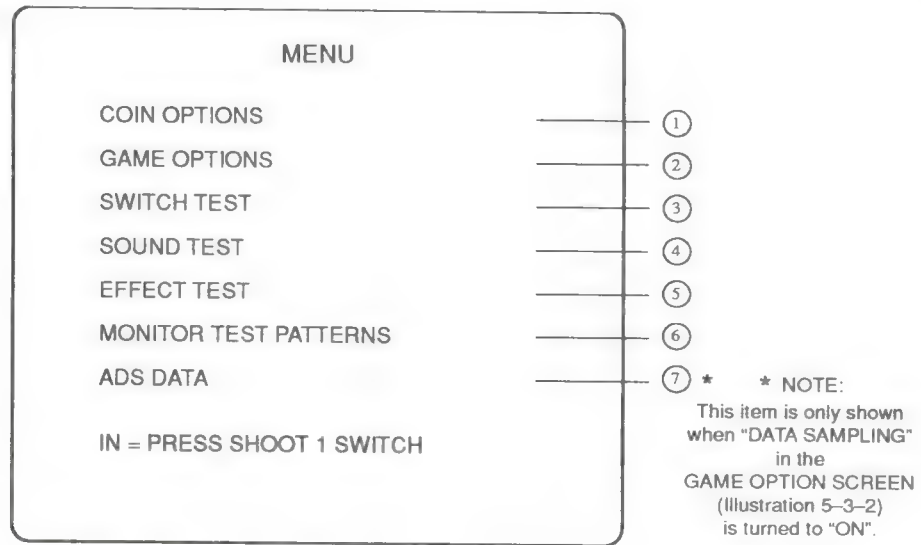


Illustration 5-2, MENU SCREEN

1. Selecting Menu Item
Select an item to be changed by moving the lever "FORWARD" and "BACK" (Ref. Illustration 5-3) until the desired item is illuminated in red letters.
2. Activating Selected Screen
To activate the selected screen, press the trigger (SHOOT 1) on the lever, and the selected screen will be displayed.
3. After all desired changes have been made, you may exit the Test Mode by turning "OFF" the Test Switch (all changes will be retained), or press the Service Switch to make the various test screens appear in sequence EACH TIME THE SERVICE SWITCH IS PRESSED.

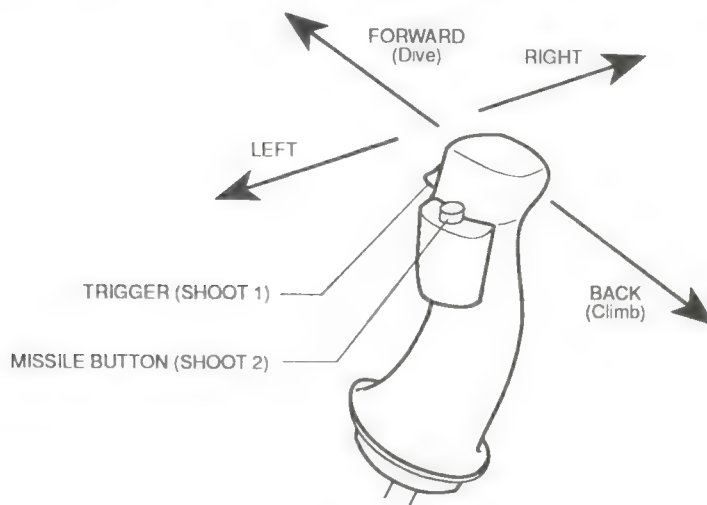


Illustration 5-3, JOYSTICK CONTROLS

5-3-1 Setting Game Fees (Coin Option Screen)

The Coin Option Screen is used to change the game fees. Any item displayed on this screen (Illustration 5-4) can be changed per the settings shown on the Table of Coin Option Settings (Illustration 5-5) as follows:

- Select the item to change by moving the lever "FORWARD" or "BACK."
- Change the contents of an item by pressing the trigger (SHOOT 1).
- To return to the Test Menu Screen, press the missile button (SHOOT 2).

COIN OPTIONS
<DEFAULT IN GREEN>

FREE PLAY
NO

GAME COST
3 COINS 1 CREDIT

CONTINUE PLAY
3 COINS

COIN 1 MECH VALUE
1 COIN COUNT AS 1 COIN

COIN 2 MECH VALUE
1 COIN COUNT AS 1 COIN

BONUS FOR QUANTITY BUY-IN
NONE

EXIT = PRESS SHOOT 2 SWITCH

(a)

(b)

(c)

(d)

(e)

(f)

Illustration 5-4, COIN OPTION SCREEN

ITEM	CONTENT (◀ standard setting)	
(a) FREE PLAY	NO ◀ YES	
(b) GAME FEES	No. of coins required for one game (one credit)	1-9 Coins (original setting is 3 ◀)
(c) CONTINUE FEES	No. of coins required for continuation of play	NONE (no continuation) 1-9 Coins (original setting is 3 ◀)
(d) COIN COUNTER 1	1 Coin counts as "X" coin(s)	1-9 Coins (original setting is 1 ◀)
(e) COIN COUNTER 2	1 Coin counts as "X" coin(s)	1-9 Coins (original setting is 1 ◀)
(f) BONUS COIN	One bonus coin is added when the specified number of coins is entered	NONE ◀ 2-9 Coins give 1 extra coin

(NOTE) Both Coin Counters (d) and (e) must have the same setting to allow for continuation of play, even if (c) is set to allow it.

Illustration 5-5, TABLE OF COIN OPTION SETTINGS

5-3-2 Changing the Game Settings (Game Option Screen)

Selecting the Game Options item on the Menu Screen, allows game option setting (i.e. difficulty etc.) to be made.

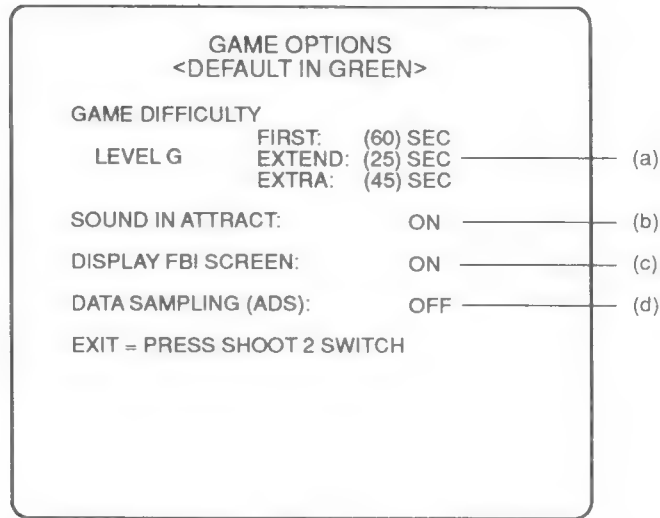


Illustration 5-6, GAME OPTION SCREEN

Items displayed in green can be changed per settings shown in the Table of Game Option Settings (Illustration 5-7) as follows:

- Select the item to change by moving the lever "FORWARD" or "BACK".
- Change the contents of that item by pressing the trigger (SHOOT 1).
- To return to the Menu Screen, press the missile button (SHOOT 2).

ITEM	CONTENT (◀ standard setting)
(a) GAME DIFFICULTY (8 levels by adjusting time)	A (Easy) G (Standard) ◀ H (Hard)
(b) ATTRACT SOUND	ON (with sound) ◀ OFF (without sound)
(c) FBI DISPLAY	ON (Yes) ◀ OFF (No)
(d) ADS SAMPLING	OFF (No) ◀ ON (Yes)

Illustration 5-7, TABLE OF GAME OPTION SETTINGS

5-3-3 Switch Test – Used to test the switches and potentiometers

5-3-4 Sound Test – Used to test sounds and music

5-3-5 Effect Test – Used to test effects and lights

5-3-6 Monitor Test Patterns – Used to test the monitor

5-3-7 ADS Data – Used to track and display game data if "ADS" is set to "ON" on the Game Option Screen.

5-4 Initializing Controls

When replacing the game PCBs, ROMs, Joystick, Throttle Control, and/or potentiometers, be sure to follow the procedures below.

1. Open the coin door.
2. Place the Joystick and the Throttle Control in the centered position, and press the Service Switch.
3. While pressing the Service Switch, set the Test Switch to "ON".
4. The potentiometer value on the Reset Screen will clear to "00".
5. Return the test switch to "OFF" to return to the attract mode.

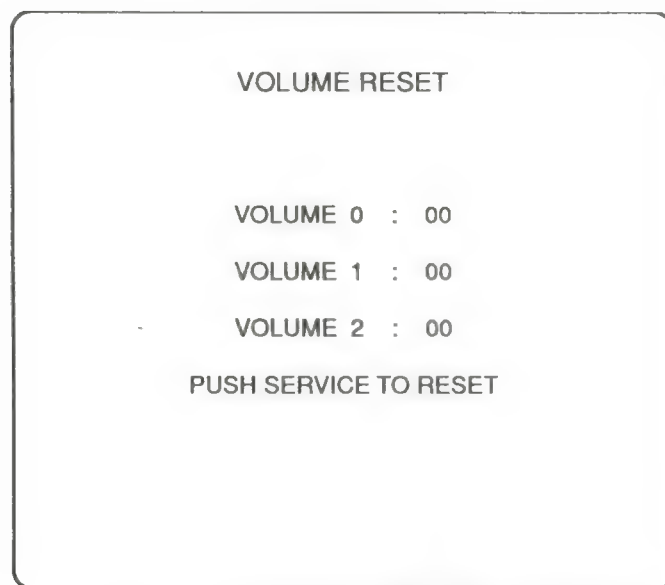


Illustration 5-8, VOLUME RESET SCREEN

6. HOW TO PLAY

- AIR COMBAT is a game that assigns the player a mission to shoot down and destroy all enemy fighters that appear on the screen. The player has both a machine gun and missiles that are fired by using two separate control buttons.
- After inserting the proper coin(s), a player first selects a game difficulty level (CADET, CAPTAIN or ACE) by moving the lever left or right within the time allotted as shown on a display in the center of the screen. If no level is selected, one is assigned automatically.
- The player starts the game by pushing the start switch located on the cockpit console.
- Enemy fighter planes appear one at a time.
- The player attempts to shoot them down using the machine gun and missiles. The machine gun is fired with each pull of the trigger. If a player keeps the trigger depressed, the gun fires continuously. Missiles must be "launched" individually.
- The player's missiles are limited in number, but there are enough machine gun "bullets" for the time allotted to the entire game. No more than two missiles can be fired at one time.
- The player's rank is determined by his/her proficiency in playing the game.
- The three levels are:
 - CADET – This is a training mode for players learning the game. The player can clear this level easily using only missiles. The game pauses occasionally to provide hints on how to play. The messages can be bypassed by pressing the missile and machine gun buttons simultaneously. The game ends when six enemy aircraft have been destroyed. No rank is awarded.
 - CAPTAIN – This is a difficulty level in which the player receives no hints on how to play. If a player shoots down four enemy aircraft, the battle scene changes from over land to over water. If the player shoots down all six aircraft, the game ends. The player's rank is indicated. Players can increase their ranking by destroying the enemy aircraft with the machine guns.
 - ACE – This is a difficulty level which a player cannot clear without mastering the use of the machine gun. If a player shoots down three aircraft, the scene changes from land to sea.

When the player shoots down three more enemy aircraft (a total of six), the player is allowed to attempt a landing on an aircraft carrier. If the player fails the landing, the game is over. However, if player lands successfully, the strongest enemy of the game appears for the final stage. If the player can shoot down that enemy, the game ends, and the player is awarded the top rank of "Commander-in-Chief".
- The game is over when a player shoots down all enemy planes, or game time (operator adjustable) runs out.

CAUTION
BE SURE TO UNPLUG THE AC POWER BEFORE
CONDUCTING ANY MAINTENANCE PROCEDURES.

7. MAINTENANCE

7-1 Removing the PCB Tray Assembly (Refer to Section 9-1 for illustration)

1. Unlock and open the service door on the side of the base of the seat assembly.
2. Remove the two (2) bolts securing the tray to the slideout rack.
3. Pull tray forward and out to remove.
4. Reverse these steps to secure the tray.

7-2 Removing the Game PC Boards

1. Unlock and open the service door on the side of the base of the seat assembly.
2. Remove the two (2) bolts securing the tray to the slideout rack.
3. Pull tray forward until PCB Card Cage clears the base assembly opening, but do not pull the PCB tray all the way out.
4. Disconnect the 60 position connector from the EMI Board.
5. Open the card cage by removing the four phillips head screws (M5 x 20) securing the EMI cover cage cap to the cage.
6. Remove the EMI cover.
7. Open the white PCB retaining latches at each side of the boards, and pull the PCBs gently outward to remove. **NOTE:** Each PCB has an assigned position and must remain in that position for proper operation.
8. Repeat step 7. to remove the other three PCBs.

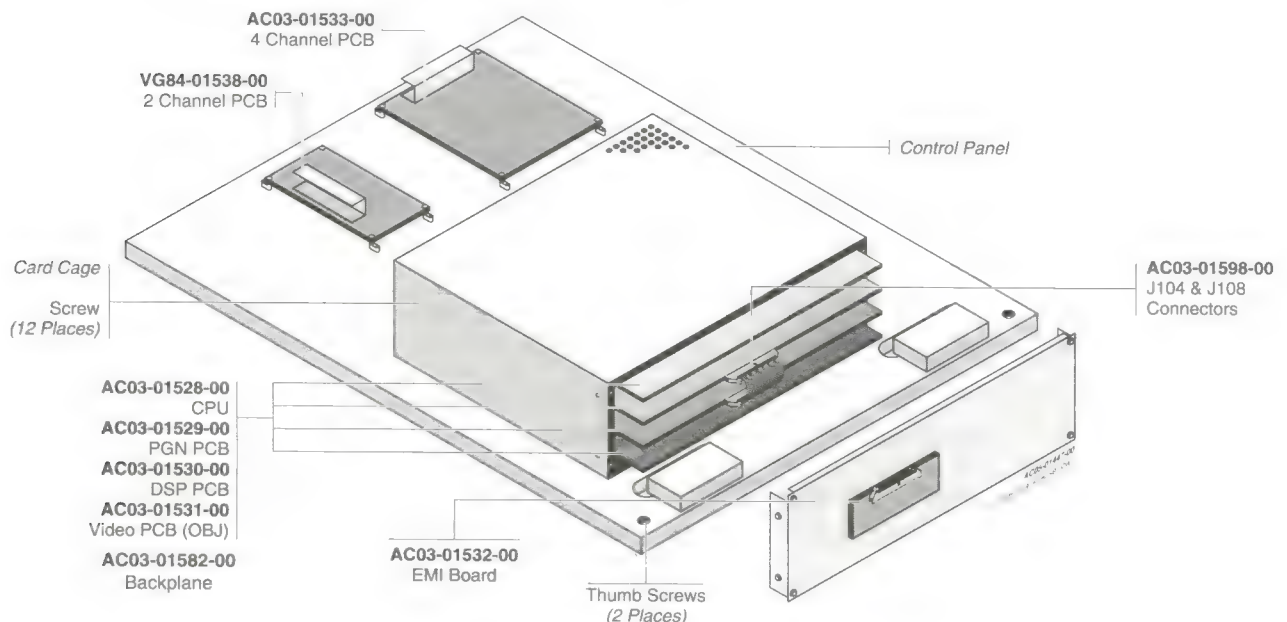


Illustration 7-1, REMOVING GAME PCBs

CAUTION
BE SURE TO UNPLUG THE AC POWER BEFORE
CONDUCTING ANY MAINTENANCE PROCEDURES.

9. To reinstall, fit the PCBs on their respective cage rails and firmly insert them, making sure that their edge connectors are properly seated with the internal connectors.
10. Resecure the white PCB retaining latches.
11. Reinstall the EMI cover by resecuring the four phillips head screws, making sure to reconnect the EMI Board connector to the EMI PCB.
12. Push the tray back into the base cabinet.
13. Reattach the two bolts securing the tray.

7-3 Replacing the Lamps

7-3-1 Replacing Cockpit Fluorescent Lamp

Refer to Section 9-2 for illustration

- a. Remove the screws securing the front cover on the cockpit assembly.
- b. Remove the fluorescent lamp from its holders by rotating tube and pulling outward.
- c. Replace with a new 15 watt fluorescent lamp.
- d. Reinstall the front cover in its original position.

7-3-2 Replacing Fluorescent Lamp of Marquee Assembly

Refer to Section 9-3 for illustration

- a. Remove the three (3) bolts securing the Marquee Signboard top molding, and remove it.
- b. Slide the acrylic Marquee panel up and lift out.
- c. Remove the defective fluorescent lamps (there are two (2) 18" lamps) from its holders by rotating tube and pulling outward.
- d. Replace with a new 15 watt fluorescent lamp(s).
- e. Reinstall the Marquee Sign and top molding in their original positions.

7-3-3 Replacing Cockpit Incandescent Lamp

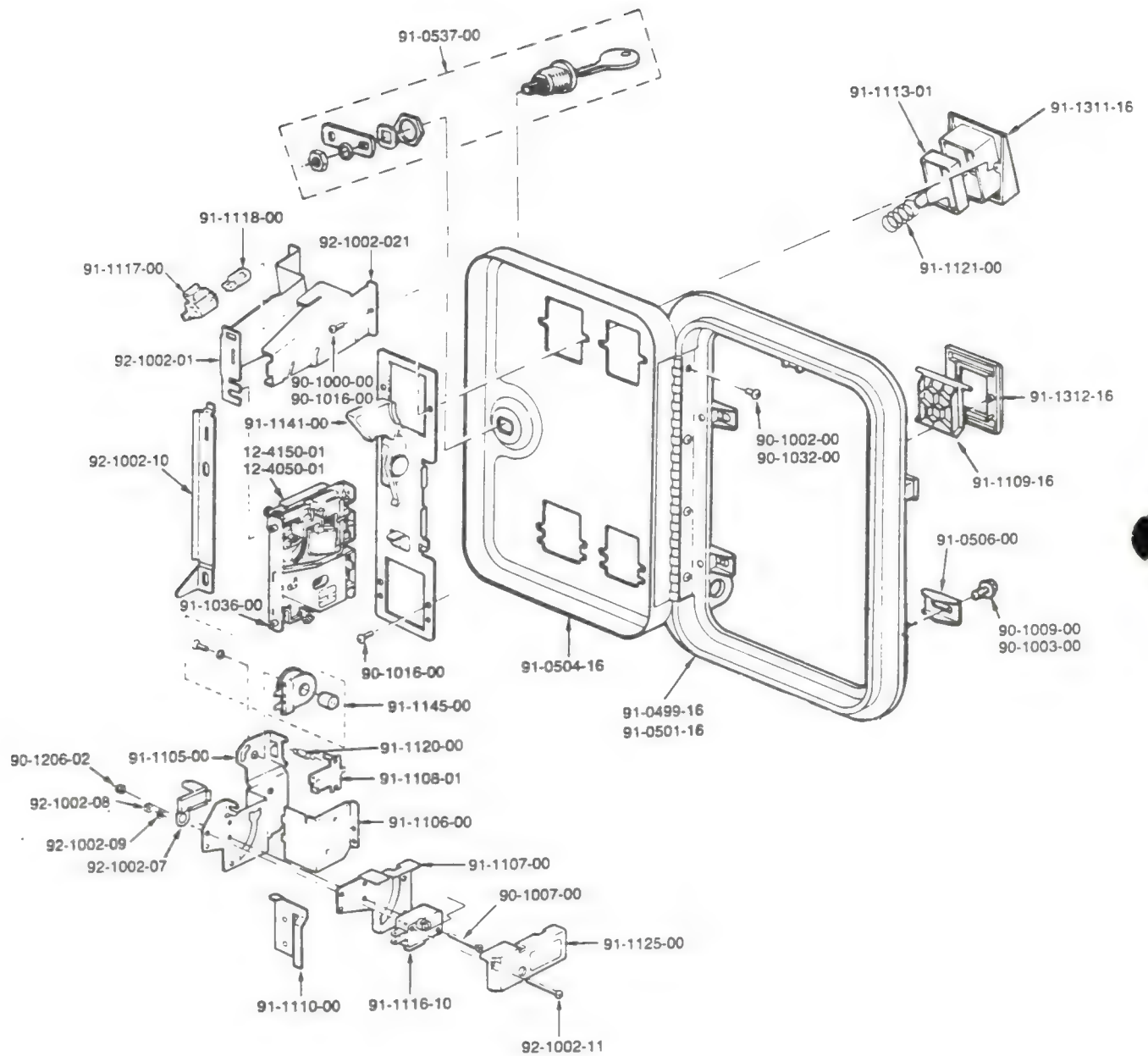
Refer to Section 9-2 for illustration

- a. Remove the four (4) screws securing the cockpit indicator panel, and remove it.
- b. Replace the defective GE 161 bulb(s) by pulling forward from socket.
- c. Replace the indicator panel.

TROUBLESHOOTING – GENERAL

If you suspect the game may be malfunctioning, the following steps should be taken before you make a service request.

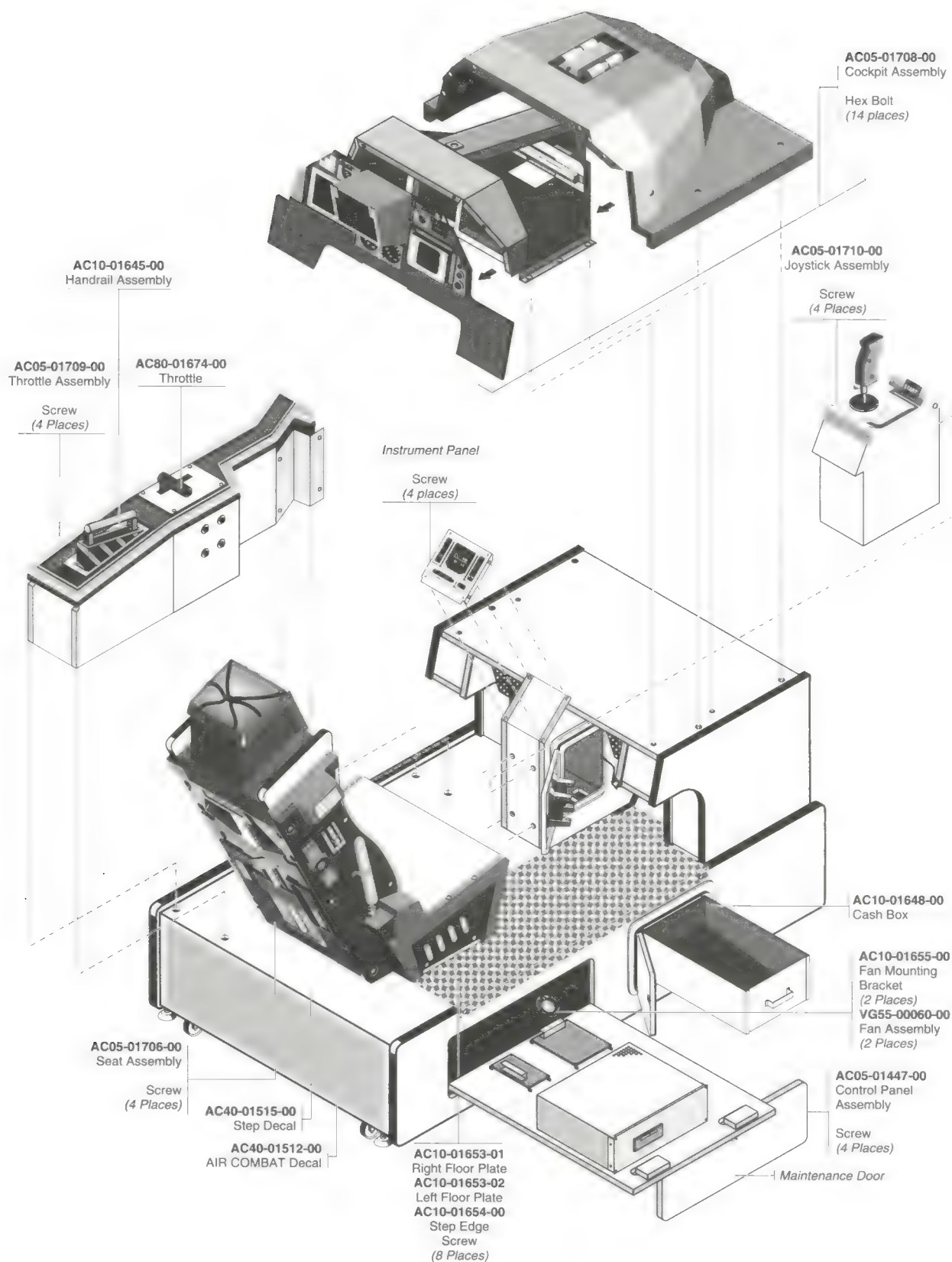
- (1) Check to see that the circuit breaker is properly set.
 - (2) The power supply should be set to either 110 or 220 Volts AC. However, when some other equipment (air conditioner, multiple pinball games, air compressors, etc.) are connected to the same power supply, the voltage may change beyond this range and cause game trouble or improper operation.
 - (3) When the game does not work with the power turned on, turn the power off, wait ten seconds, then turn the power back on. This may restart the game. If it still does not work, inspect the fuse.
 - (4) When the game PCB, the ROMS, Joystick, Throttle, or Potentiometers are replaced, it is necessary to make initialization adjustments to play normal games. Make appropriate adjustments referring to section 5-4.
 - (5) Check all wiring connections as malfunctions can be caused by loose connections.
 - (6) Foreign substances or dust on the game PCB or on the monitor PCB, may cause malfunctions or improper operation. Check that the PCBs are clean.
 - (7) When you make electrical checks, use the wiring diagrams for reference.
- * If the above suggestions are not applicable, or no improvement is observed, contact your distributor or the service office printed on the back cover of this manual.
 - * **DO NOT ATTEMPT TO REPAIR THE GAME PCB YOURSELF.** Instead, please return the board to your distributor for any repairs. The PCB contains sensitive chips that could be destroyed even by the internal voltage of a multimeter.
 - * When sending parts to be repaired, make sure to pack them firmly with a complete explanation of the problem. When sending PCBs, package them in anti-static foam or bubble wrap, and pack them in cardboard boxes to protect against impact damage during shipment. To ship monitors, pack them in wooden frames so that CRT's and PCBs are protected against excess load.



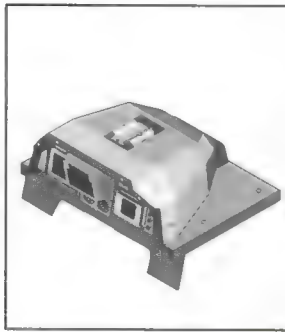
COIN CONTROLS COIN DOOR ASSEMBLY

Parts Drawings

9-1 BASE ASSEMBLY, Front View



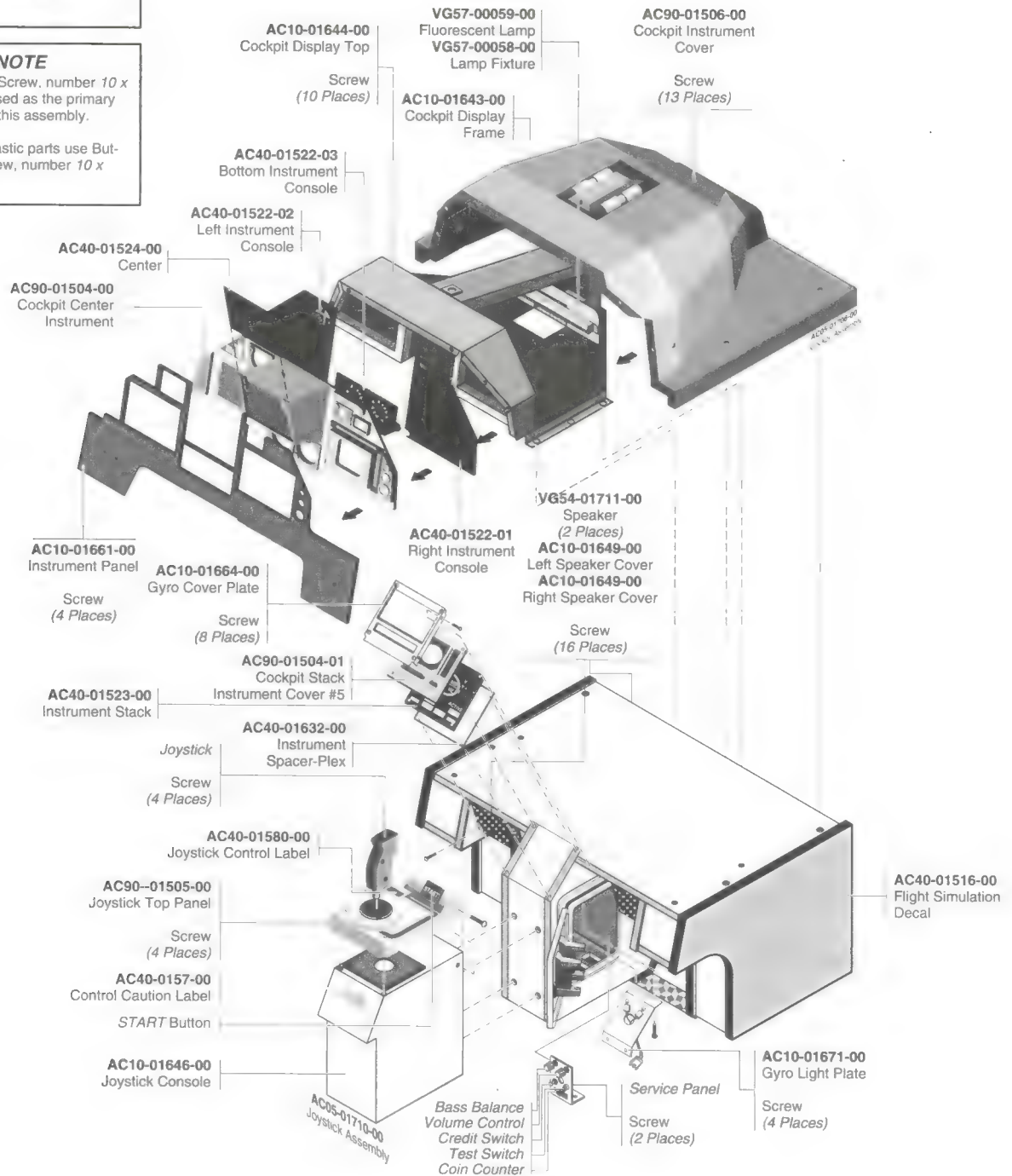
9-2 COCKPIT ASSEMBLY – AC05-01708-00



NOTE

Button-Head Screw, number 10 x 24 x 3/4" is used as the primary hardware for this assembly.

Except, all plastic parts use Button-Head screw, number 10 x 24 x 1 1/4".



9-3 MONITOR CABINET ASSEMBLY – Front

VG57-00058-00
Fluorescent Light Fixture
VG57-00059-00
15W Fluorescent Light
(2 Places)

AC40-01525-00
Monitor Marquee

AC10-01637-00
Retainer
(2 Places)

AC99-01675-00
Monitor Glass

AC10-01636-00
Glass Top Bracket

Left Side Cover
AC40-01526-02
Left Side Decal
(Not Shown)

AC10-01641-00
Glass Bottom Bracket

AC10-01634-00
Speaker Grill

AC10-01652-00
Cover
Bolt
(6 places for the cover)

TO THE BACK OF THE CABINET

AC10-01651-00
Interconnect Box

Bolt
(8 places to connect the
box to the monitor cabinet
and the game cabinet)

Marquee Box

NOTE

Button-Head Screw, number 10 x
24 x 3/4" is used as the primary
hardware for this assembly

AC05-01707-00
Marquee Assembly

Power Switch

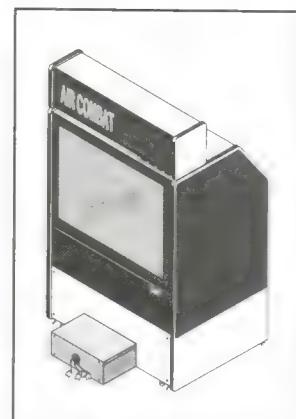
AC40-01526-01
Right Side Decal

AC40-01631-00
Remote Window Cover

Right Side Cover

VG20-00095-00
Adjustable Glide
MKRL-50-12-80B6

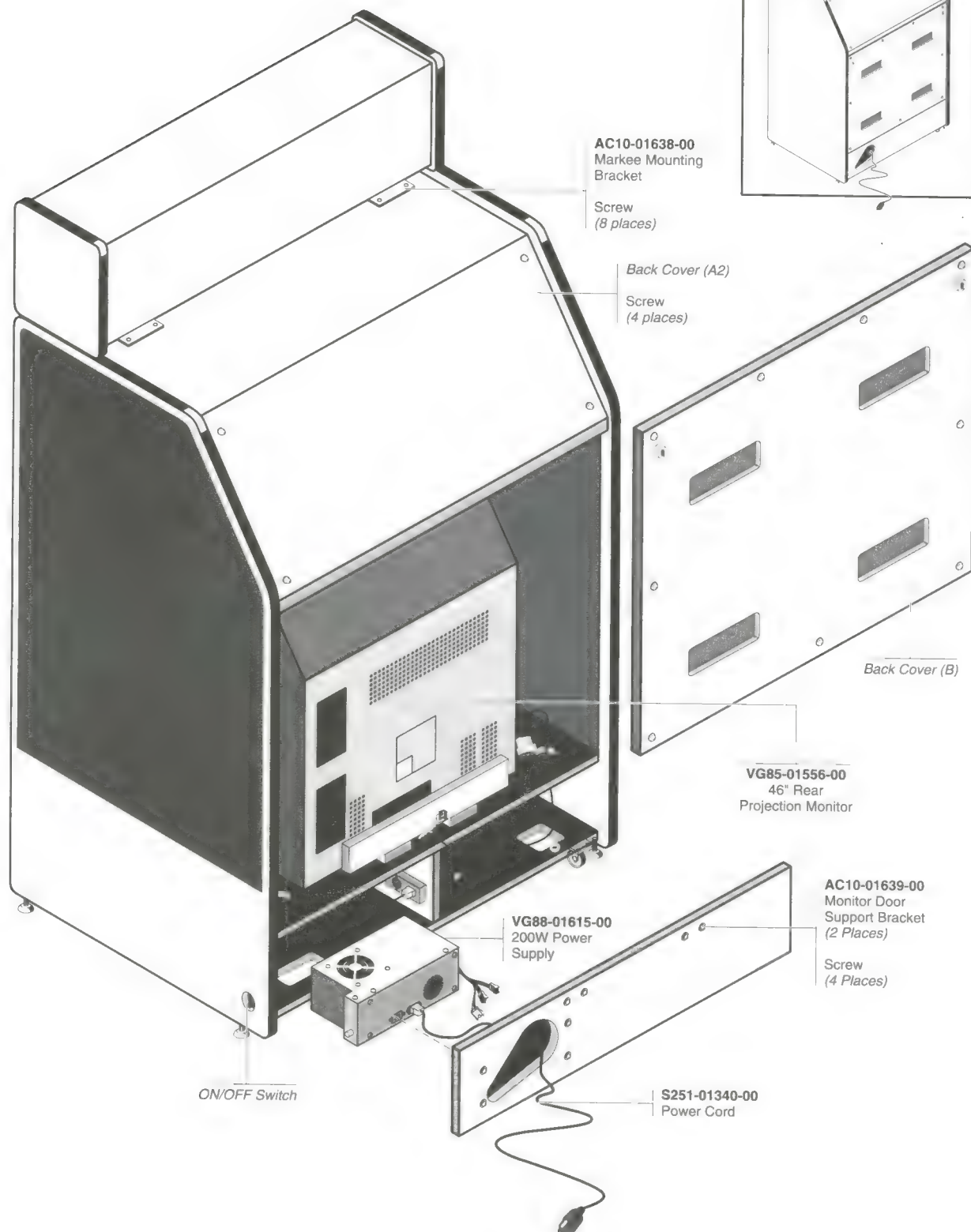
VG24-00047-00
#420S-N-0 75 Caster



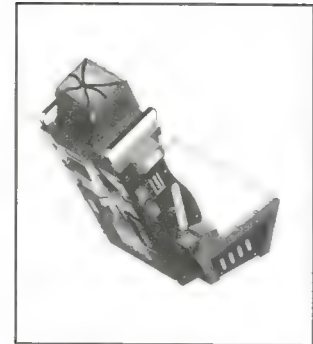
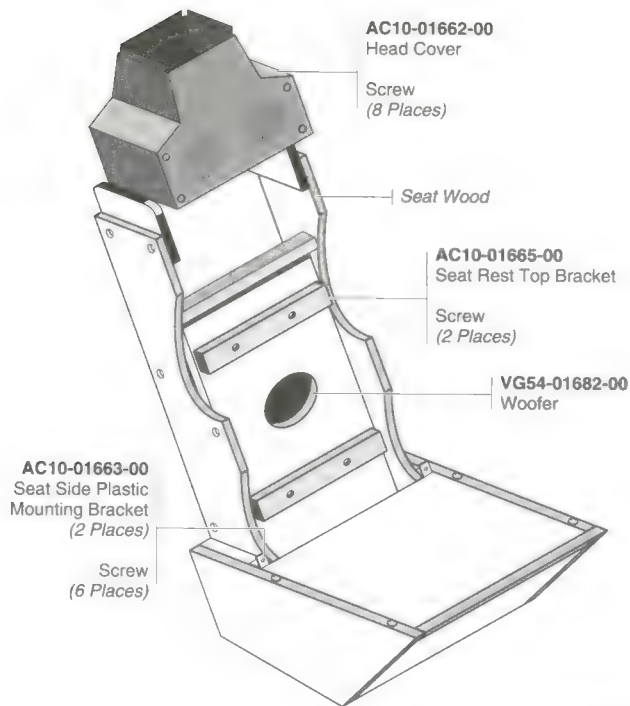
9-4 MONITOR CABINET ASSEMBLY – Rear

NOTE

Button-Head Screw, number 10 x 24 x 3/4" was used as the primary hardware for this assembly.



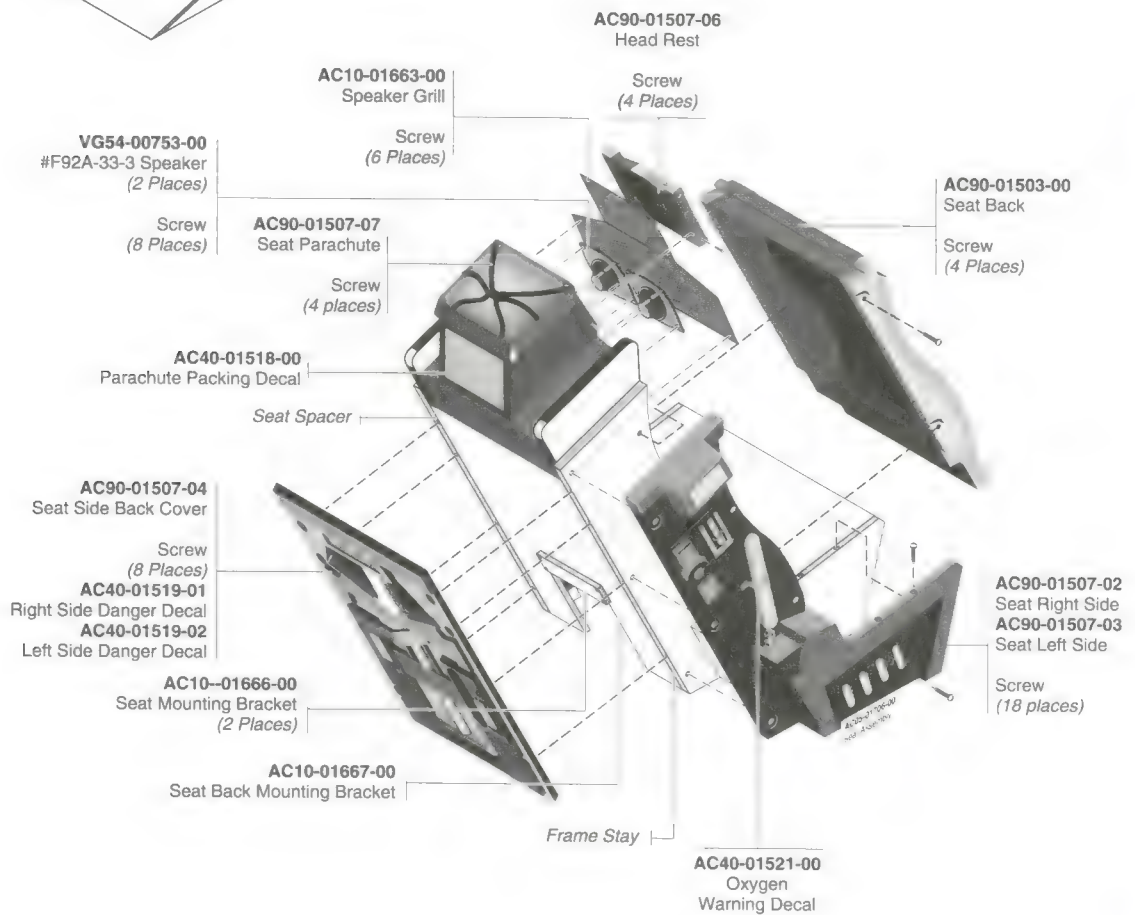
9-5 SEAT ASSEMBLY – AC05-01706-00



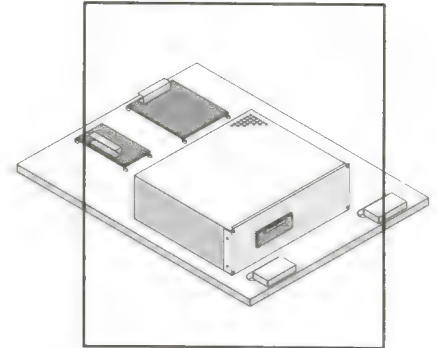
NOTE

Button-Head Screw, number 10 x 24 x 3/4" is used as the primary hardware for this assembly.

Except, all plastic parts use Button-Head screw, number 10 x 24 x 1 1/4".

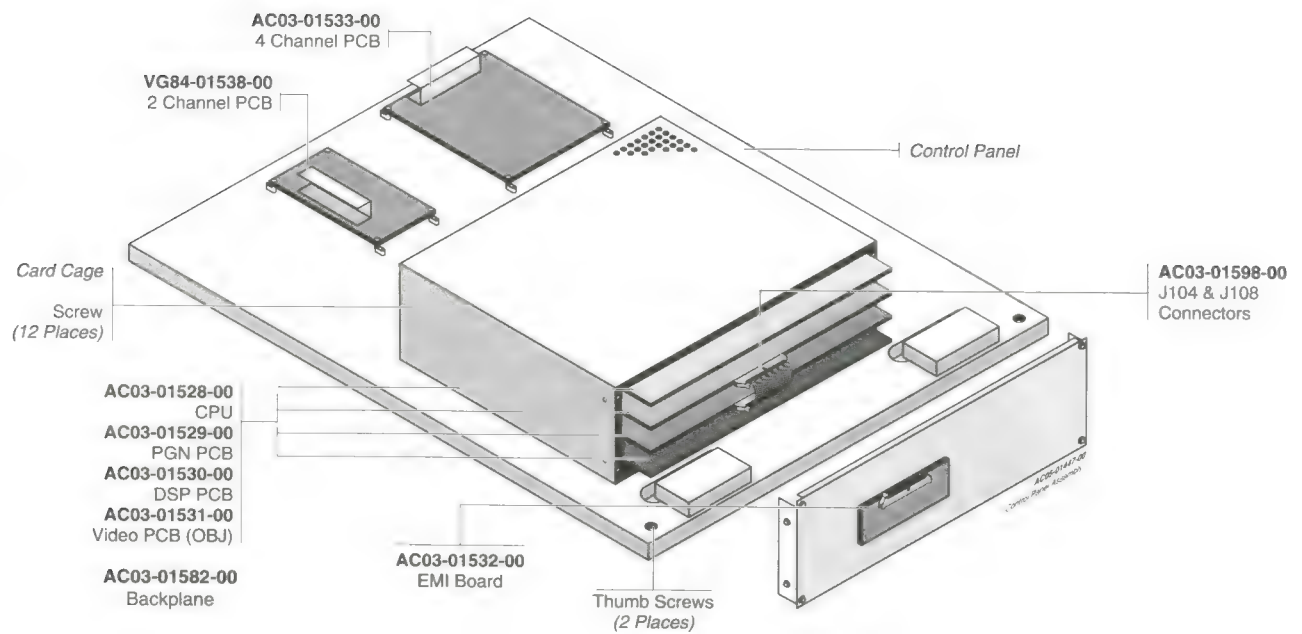


9-6 CONTROL PANEL (LOGIC BOARD) ASSEMBLY – AC05-01447-00



NOTE

Button-Head Screw, number 10 x 24 x 3/4" is used as the primary hardware for this assembly.



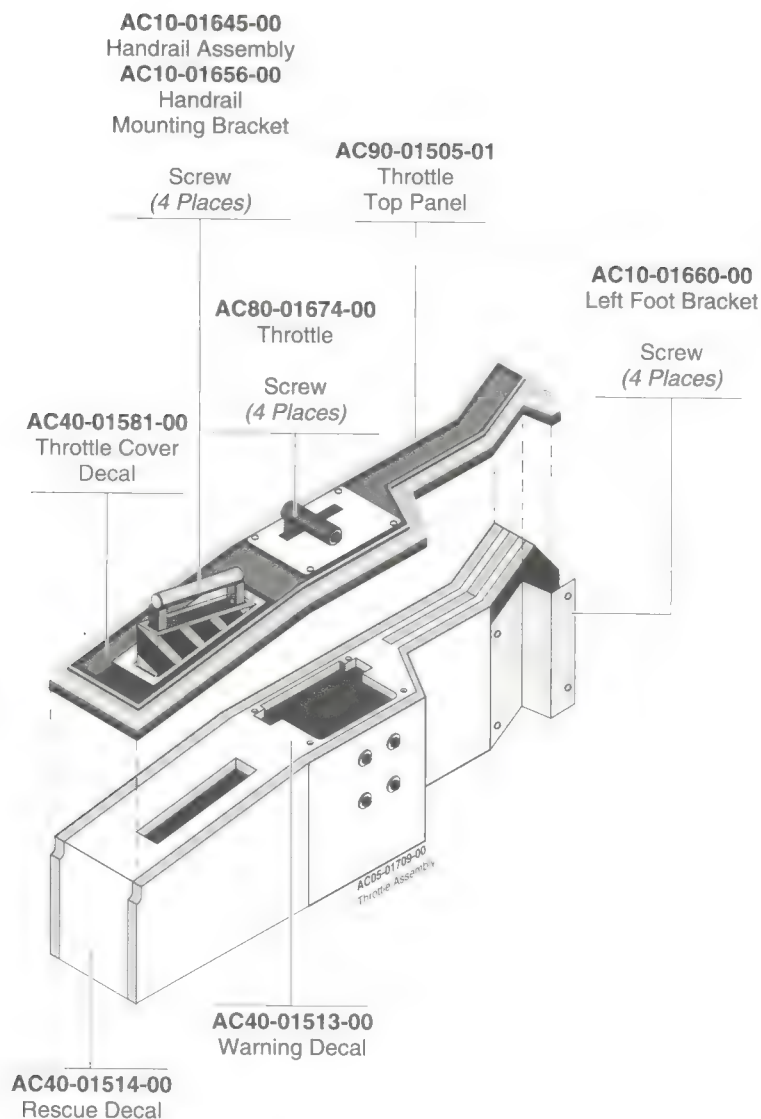
9-7 THROTTLE ASSEMBLY – AC05-01709-00



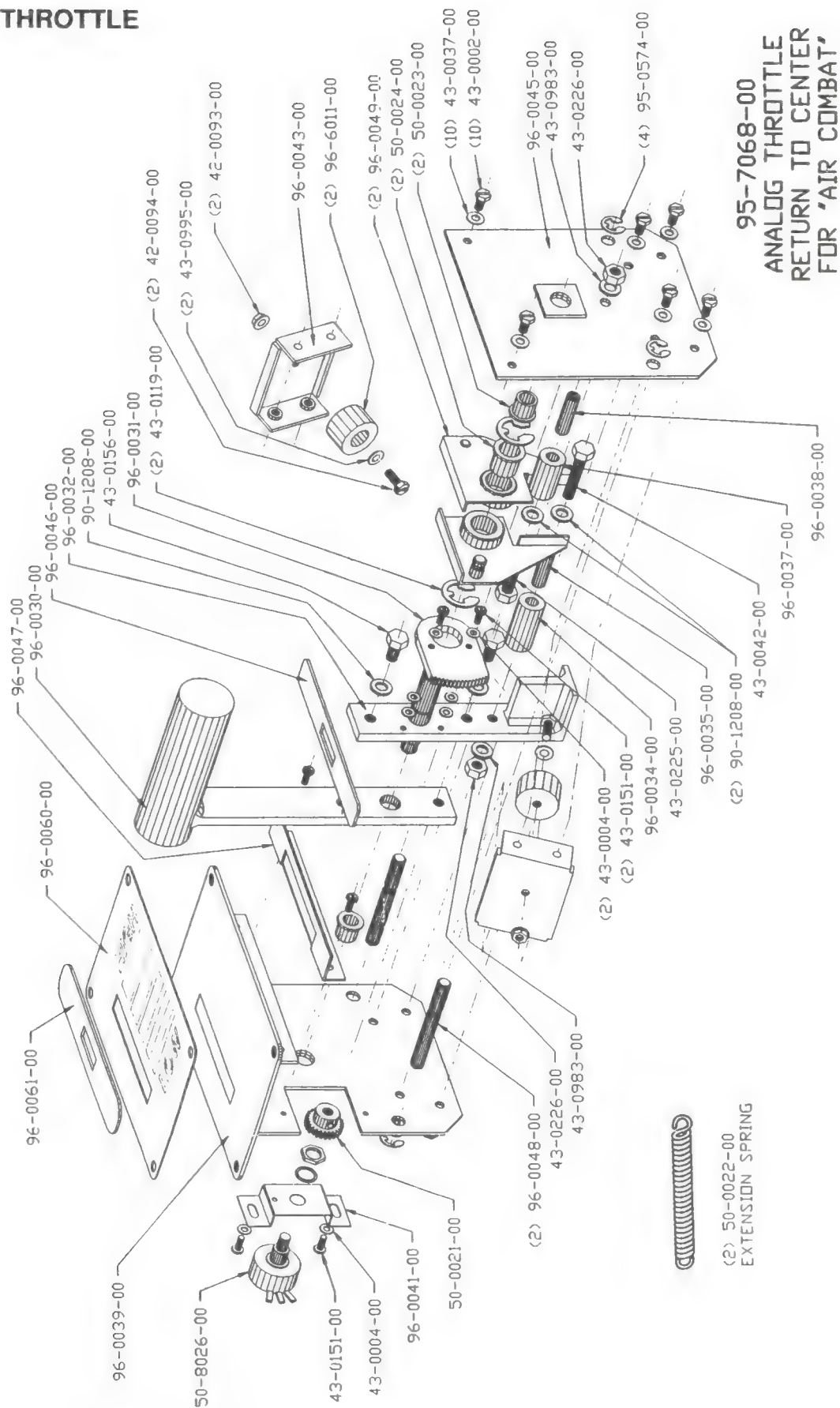
NOTE

Button-Head Screw, number 10 x 24 x 3/4" is used as the primary hardware for this assembly.

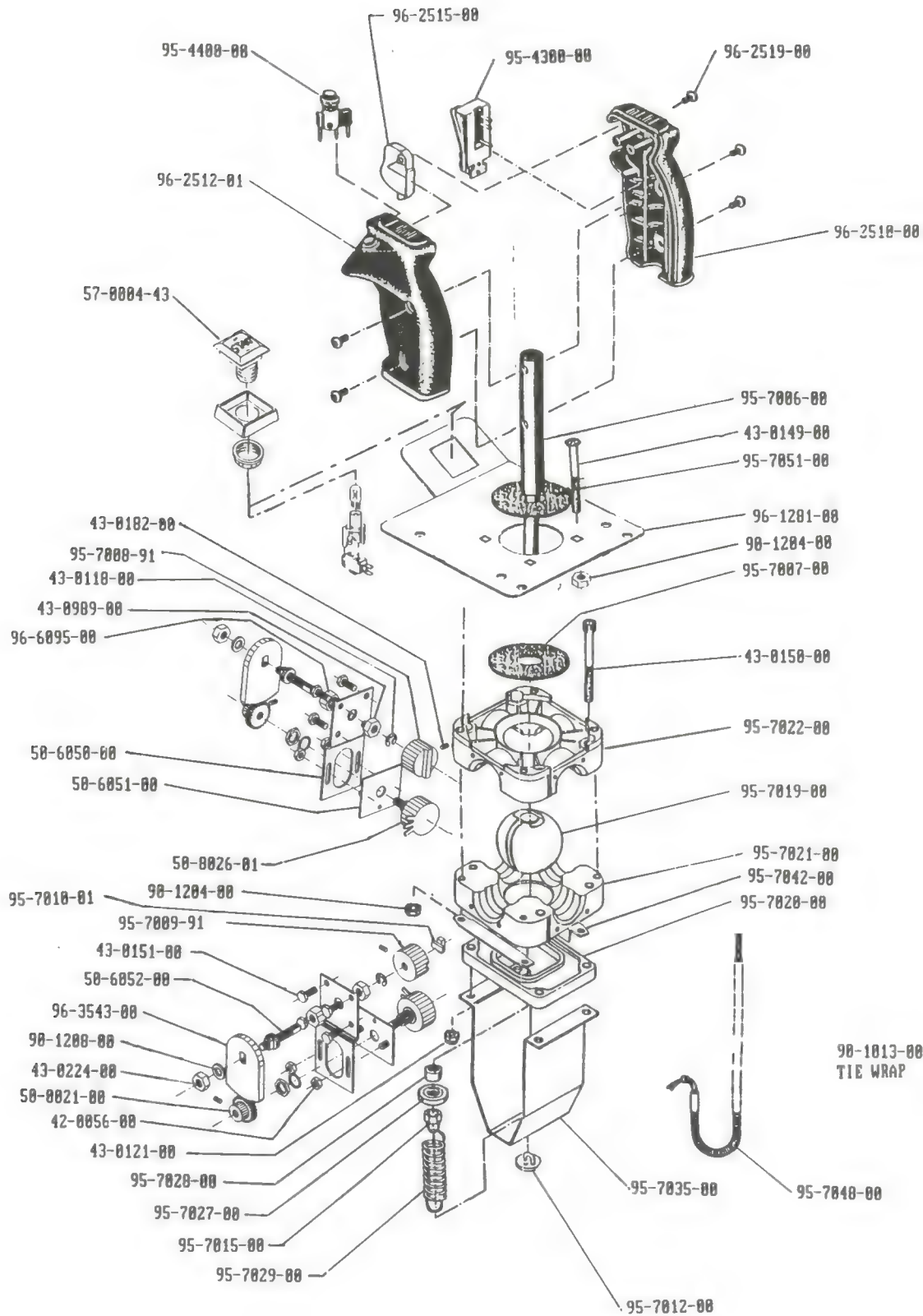
Except, all plastic parts use Button-Head screw, number 10 x 24 x 1 1/4".



9-8 THROTTLE

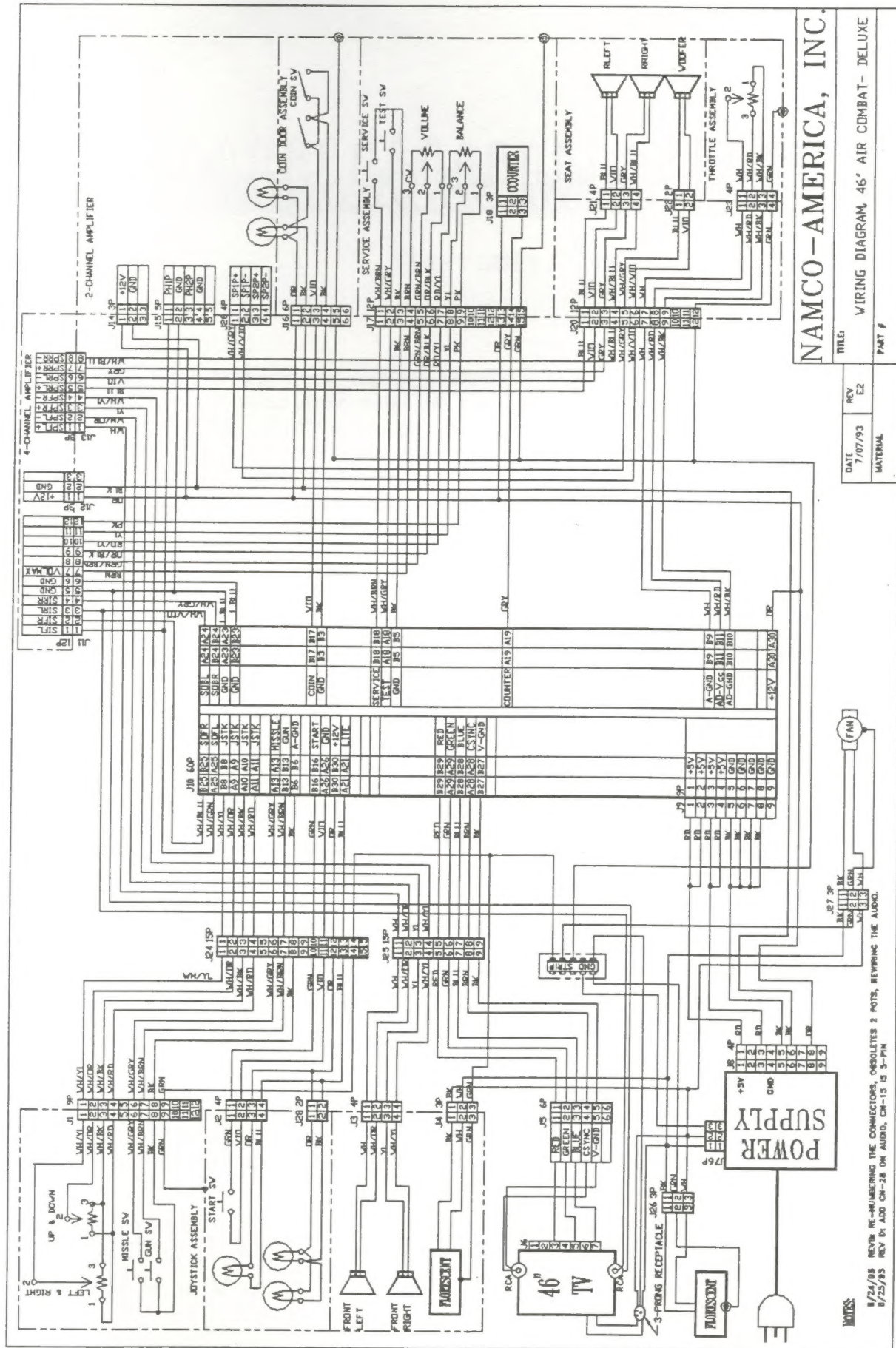


9-9 JOYSTICK



95-7067-00
ANALOG JOYSTICK W/
MOUNTING PLATE AND CABLE
FOR "AIR COMBAT"

Wiring Diagram



AIR COMBAT™ WIRING DIAGRAM

NAMCO-AMERICA, INC.

DATE	REV	FILE
7/17/93	E2	
MATERIAL	PART #	

WIRING DIAGRAM, 46" AIR COMBAT- DELUXE

NOTES:

8/24/93 REV B: RE-NUMBERING THE CONNECTORS, OBSOLETE 2 POTS, REWIRING THE AUDIO.
8/25/93 REV D: ADD CH-28 ON AUDIO, CH-15 IS 5-PIN

NOTES

Warranty

Seller warrants that its printed circuit boards and parts thereon are free from defects in material and workmanship under normal use and service for a period of ninety (90) days from the date of shipment. Seller warrants that its video displays (in games supplied with video displays) are free from defects in material and workmanship under normal use and service for a period of thirty (30) days from date of shipment. None of the Seller's other products or parts thereof are warranted.

If the products described in this manual fail to conform to this warranty, Seller's sole liability shall be, at its option, to repair, replace, or credit Buyer's account for such products which are returned to Seller during said warranty period, provided:

- (a) Seller is promptly notified in writing upon discovery by Buyer that said products are defective;
- (b) Such products are returned prepaid to Seller's plant; and
- (c) Seller's examination of said products discloses to Seller's satisfaction that such alleged defects existed and were not caused by accident, misuse, neglect, alteration, improper repair, installation, or improper testing.

In no event shall Seller be liable for loss of profits, loss of use, incidental or consequential damages.

Except for any express warranty set forth in a written contract between Seller and Buyer which contract supersedes the terms herein, this warranty is expressed in lieu of all other warranties expressed or implied, including the implied warranties of merchantability and fitness for a particular purpose, and of all other obligations or liabilities on the Seller's part, and it neither assumes nor authorizes any other person to assume for the Seller any other liabilities in connection with the sale of products by Seller.

Namco-America, Inc. distributors are independent, being privately owned and operated. In their judgement they may sell parts or accessories other than Namco-America, Inc. parts or accessories. Namco-America, Inc. cannot be responsible for the quality, suitability or safety of any non-Namco-America, Inc. part or any modification including labor which is performed by such distributor.

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Reorder Number AC45-01628-00